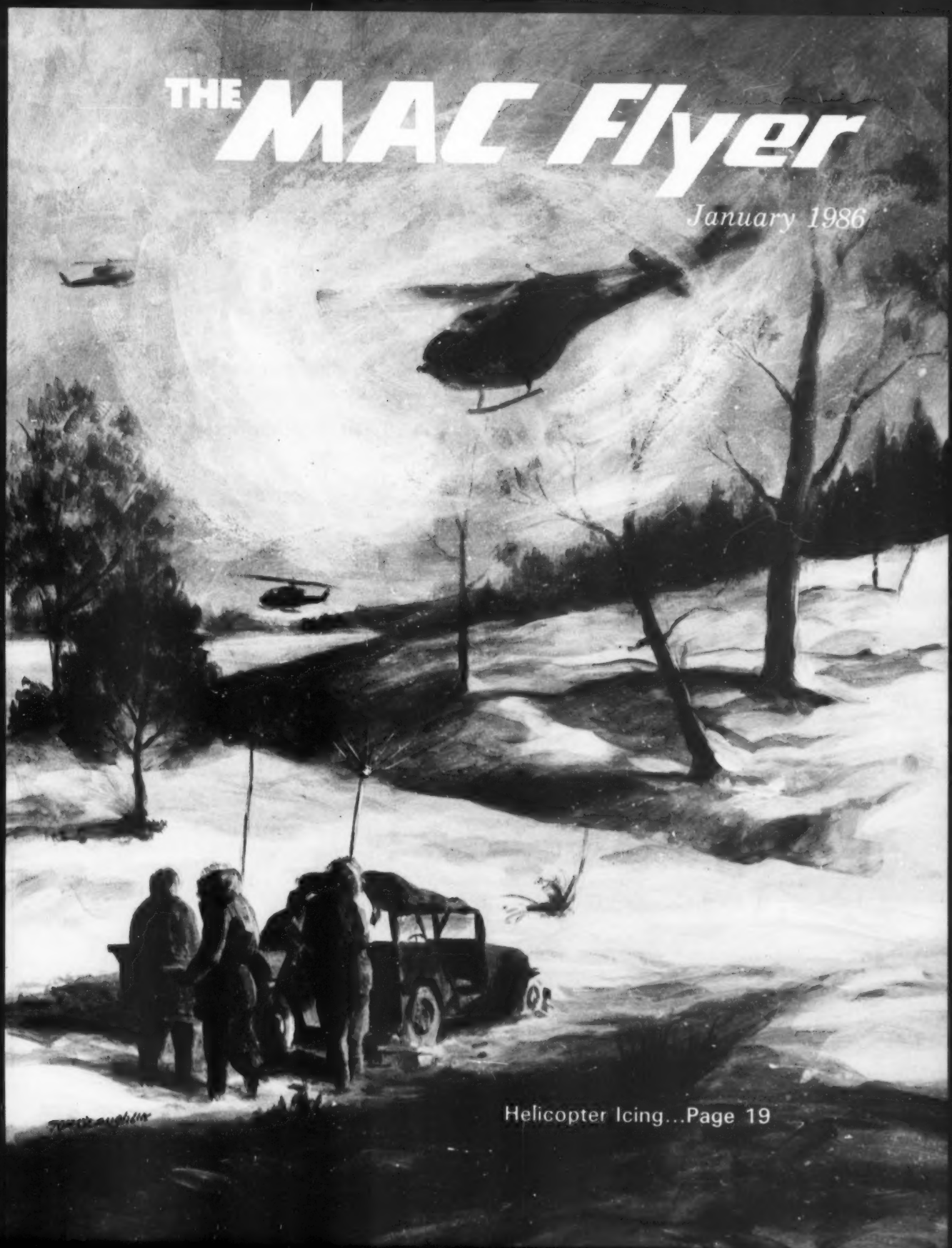
THE MAC Flyer

January 1986



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THE MAC Flyer

For Greater Safety in MAC Air Operations

January 1986 | MACRP 127-5 | VOL XXXII NO. 1

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About the cover—Original artwork by Tommy O'Laughlin

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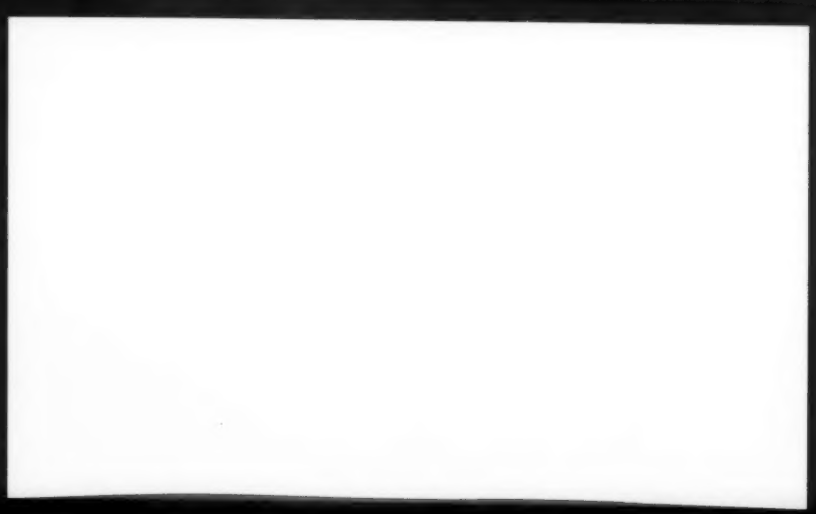


We're Here to Help

Things Aren't so Bad

Cheer up! Things aren't so bad! Sure, the new year didn't start out so well for you. Okay, so what if you couldn't find a date for New Year's Eve and your spouse did. Don't think twice about the "Lucky Lotto" ticket (with *all six* numbers right) that was eaten by your pet snake Marmaduke. It's no big deal that your new car with that expensive audio warning option speaks Japanese and you don't. Look at it this way, things can only get better.

As a matter-of-fact, the staff of *The MAC Flyer* is here to offer you a once-in-a-lifetime (this year) chance to redeem yourself. That's right, fellow aviators, your luck is about to change! That is, of course, if you sit down now, take pen, pencil, or crayon in hand and scribe onto parchment your entry in the MAC Flight Safety Writing Contest. The only limits placed on this notorious story (or poem) is your imagination and the requirement for a flight safety or flight mishap prevention moral.

You now have an enviable opportunity to help make the skies safer by letting others learn from that last hair-raising experience you were "lucky enough" to have had. Not only that, but when your masterpiece wins, you will receive a beautifully engraved desk set or plaque as well as a **free** one-year subscription to *TMF*. So quit bemoaning your luckless lot. Pull up a seat and jot down your safety memoirs. Send it to us and we'll change your luck for the better. You can't go wrong. *Do it today!*

THE RULES

The 1986 MAC Flight Safety Writing Contest is conducted according to MACR 900-3 and these rules. All entries must be original, unpublished and postmarked no later than 31 March 1986. Stories must be between 1,000 and 3,000 words long (about 6 to 14 double-spaced typed pages). Poetry should be about 75 to 100 lines. Entries must contain an *aviation safety/mishap prevention message*. Manuscripts must be double-spaced, typed and submitted in two copies. Identify entries by title only and attach a cover sheet showing the author's name, address, duty phone number and unit. The cover sheet must contain a brief autobiography.

The contest is open to anyone. Entries qualifying under the above rules earn their author a free one-year subscription to *The MAC Flyer*. However, contest prizes (desk sets and plaques) may only be awarded to military members and civilian employees of the Department of the Air Force or Air Reserve Forces. Other entrants may be selected for Honorable Mention in a special category. All winning stories will be published in *The MAC Flyer*. Entries should be addressed to:

Flight Safety Writing Contest
HQ MAC/IGFE
SCOTT AFB, IL 62225-5101

A *Real* Instrument Landing

Believe the Observation

by Capt. Anne E. Martin
437 MAW
Charleston AFB, South Carolina

The C-141 droned toward the first rays of daybreak as the desolate hills and valleys of Turkey unraveled below.

Steve wiped the grit out of his eyes and climbed into the right seat. The Starlifter crew had flown for six hours and still had eleven to go in their scheduled day. It was relaxing not to be in command. This was his first line mission since instructor upgrade and he took the opportunity to refamiliarize himself with European procedures.

Honorable Mention 1985 Flight Safety Writing Contest

1st Lt. Dale Roberts, in the left seat, requested a descent from the controller. "Copilot's radios," he told Steve. "Someone wake 2nd Lt. Jason." Dale was glad this flight was the last in a series of recommendation, check, and buddy rides. He did not envy Lieutenant Jason, who would start the same process with AC school in two weeks.

"MAC 60197, this is your PAR final controller. Weather is partially obscured, 600 meters. Turn left to heading 035; begin descent; gear should be down. Above glidepath. Do not acknowledge further transmissions."

Steve made checklist responses between the controller's instructions. "Gear down," he told GCA.

"What did he say the vis' was?" Lieutenant Jason interrupted.

"Flaps landing," Dale called. He reduced power and tried to catch up to the controller's directions.

"600," Steve answered.

Lieutenant Jason checked his conversion of meters to miles. "I don't think we have enough visibility."

"There's the field right there," Dale answered.

"On course. Well above glidepath. Increase rate of descent," chanted the controller.

"Final configuration checks good. Zero drift," Steve added. Dale noted the aircraft was still fast and high.

"We only have 600 meters visibility—not RVR," Lieutenant Jason insisted.

"There's too much chatter!" Dale growled. "I can see the runway."

"One hundred above," Steve interjected.

"On course, on glidepath."

Dale silently sighed in relief as he picked up a 3° glidepath and reached approach speed. He checked fifty feet over the threshold, reduced power and flared. Suddenly there was no horizon, only gray. He quickly went back to instruments; the radar altimeter decreased below zero and he miraculously felt a soft touchdown. "Spoilers!" he called. He used full reverse and braking as he strained to see a few feet in front of the speeding airplane. All he could see were a few centerline stripes and the beam of the landing lights reflecting off the fog. "Retract the lights," he demanded. It didn't help. It looked like they were screaming through the grayness. The INS groundspeed, however, clicked down and they eventually slowed to a halt.

"This is even less than 600 meters," Lieutenant Jason declared.

"Good job, pilot," the engineer chimed in.

Dale glanced at Steve, who was as pale as the fog. "Well," Dale's voice tremored, "after-landing check. Scanner, Jump seat, take a window each." They inched to the runway turn-off.

The airlift control element (ALCE) representative was waiting at the turn-off. People materialized out of the gray, fifty feet from the airplane. They were applauding. "We didn't think you were going to be able to land in this fog," the ALCE controller remarked as he climbed to the flight deck. "This is great."

"Yeah, well, it's real clear on top," Dale stuttered.

After he left, Dale asked Lieutenant Jason, a little too late, "What were you saying about the vis?"

"We only had 600 meters. That's less than one-half mile."

"I should have listened to you. It's just that we saw the runway when we were above

the fog bank, and USAFE Metro called seven miles visibility."

Lieutenant Jason just shrugged. They were safe. Through the dissipating mist, more and more obstructions appeared. It was a horrifying sight. Towers, poles, and equipment appeared a few feet away from the runway edges. Had Dale drifted off centerline during his gray-out landing, their C-141 would probably be missing a wing tip. He gratefully patted the wings still on his chest.

A few days later they arrived at home station.

Capt. Martin was commissioned after graduating from the Air Force Academy in June 1981. She completed UPT at Reese AFB, Texas, and then moved on to the 41 MAS at Charleston AFB, South Carolina, flying C-141s. Captain Martin is presently assigned as a C-141 simulator instructor at the 437 MAW, Charleston AFB, South Carolina.

Before Dale had a chance to escape into crew rest, the scheduler called him. "Lieutenant Roberts, I have a mission for you."

Dale reluctantly stopped by the scheduler's desk for all the details. "I hope this isn't another augmented Turkey run. Who's my copilot going to be?"

"Maj. Anders," the scheduler answered.

"Another IP? I just landed from my second buddy ride." Turning to Steve, now entering the office, Dale asked, "Captain, did you recommend I get another buddy ride?"

"No, we survived this one," Steve smiled wearily.

"Simmer down, Lieutenant," the scheduler interrupted. "Major Anders is now a first pilot."

"What happened?" the two tired pilots asked.

"Oh, he got downgraded," the scheduler declared. "Tower was calling some field below minimums, and he landed anyway because he could see the runway two miles out. The only fog was over the transmissometers. He didn't even hit anything!"

Steve and Dale glanced sideways at each other, exchanging looks that implied, "But for the Grace of God . . . ."

"It sounds to me like Major Anders was lucky," commented Steve.

"And us, too," Dale quietly added.

"What are you two talking about?" the scheduler wondered.

"Uh, nothing," Steve replied.

Outside, Dale wondered out loud, "Do you think we ought to tell anyone? The rest of the crew and the ALCE seemed to think we were heroes."

"No," Steve answered, "Let's get the rest of the crew together so we can explain to them that what we did was wrong and could easily have killed us all. We can talk about how to prevent it from happening again. I also think we should anonymously submit our story to *The MAC Flyer* Flight Safety Writing Contest. That way other crews can read it, benefit from our mistake and pay stricter attention to the rules and weather than we did."

Flying-Hour Milestones

MSgt G. L. Bryant, 300 MAS

Lt Col Wayne A. Brechtel, 357 TAS
Lt Col Franz E. Nelsson, 4 MAS
CMSgt Samuel L. Arnold, 772 TAS
CMSgt Fred R. Terry, 105 TAS
MSgt John K. Slote, 193 SOS

Maj Gen James C. Wahleithner, 4 AF/CC
Col William G. Duckwitz, 300 MAS
Col Thomas L. Sutton, 316 TAG/CC
Lt Col Gary N. Beson, 8 MAS
Lt Col Wayne A. Brechtel, 357 TAS
Lt Col Christopher P. Dixon, 375 AAW
Lt Col James A. Dole, Jr., 105 TAS
Lt Col Gary L. Groot, 318 TAS
Lt Col John L. King, 357 TAS
Lt Col Roy E. Moore, 772 TAS
Lt Col Chu E. Quon, 318 TAS
Lt Col Robert N. Sweeney, 4 MAS
Lt Col David J. Troeber, 328 TAS
Maj James P. Althoetmar, 375 AAW
Maj Michael L. Baker, Det 2, 1401 MAS
Maj Russell T. Birmingham, 105 TAS
Maj Charles H. Carter, 908 TAG
Maj Maj Edward M. Colwell, 318 TAS
Maj John A. Fette, 8 MAS
Maj Ronald G. Fowler, 185 TAS
Maj Dene T. Harper, 41 ARRS
Lt Cmdr Dale L. Harrington, 67 ARRS
Maj Randall M. Hurst, 105 TAS
Maj Michael D. McGary, 8 MAS
Maj Hanferd J. Moen, Jr., 313 MAS
Maj Bruce A. Nichols, Det 4, 1401 MAS
Maj John F. O'Malley, 357 TAS
Maj Roger A. Peltier, 337 TAS
Maj Ross C. Robb, 313 MAS
Maj William C. Robinson, 773 TAS
Maj Anthony E. Russell, 328 TAS
Maj Calvin B. Smith, 8 MAS
Maj Robert W. Sutton, 357 TAS
Maj Joseph M. Swope, 156 TAS
Maj James B. Thompson, 8 MAS
Maj Philip A. White, 4 MAS
Maj Terry S. Williams, 62 TAS
Capt David G. Hutchings, 707 MAS

Flying Hour Milestones

Capt Samuel A. Wade, Jr., 357 TAS
SMSgt Dirk Alta, 15 MAS
SMSgt Robert M. Annas, 156 TAS
SMSgt James L. Bankes, 193 SOS
SMSgt Richard E. Stephen, 97 MAS
MSgt Ralph K. Barrett, 105 TAS
MSgt Robert L. Blanchard, 8 MAS
MSgt Scott A. Ellestad, 8 MAS
MSgt Rodney S. Friese, 345 TAS
MSgt Earl E. Fussell, 357 TAS
MSgt Arthur D. Gee, 4 MAS
MSgt Marshall L. Jackson, II., 4 MAS
MSgt Erick L. Jenkins, 313 MAS
MSgt Gerald N. Lounsbury, 313 MAS
MSgt James F. Lynch, 337 TAS
MSgt Michael D. Martin, 22 MAS
MSgt John J. Meyers, 22 MAS
MSgt Robert A. Morris, 6 MAS
MSgt Joseph J. Napoli, 300 MAS
MSgt Patrick A. Nolan, 8 MAS
MSgt William F. Pons, 135 TAS
MSgt William S. Shoell, 313 MAS
MSgt Carl L. Talley, 8 MAS
TSgt David M. Adams, 156 TAS
TSgt Robert J. Carson, 86 MAS
TSgt Thomas C. Freeman, Jr., 71 ARRS
TSgt Duane F. Mountain, 55 ARRS
TSgt Burt L. Pratte, 17 TAS
TSgt Edward E. Wachter, 731 TAS
SSgt Michael E. Holman, 4 MAS
SSgt David L. Pickard, 67 ARRS
SSgt Peter K. Turley, 4 MAS

Maj Frank A. Gray, 67 ARRS
Maj Francis M. Harvey, 1551 FTS
Maj Bruce J. Hosea, 1551 FTS
Capt Gordon M. Wiram, 67 ARRS
MSgt Robert L. Hoak, 71 ARRS
TSgt Evan M. Rosenberger, 1550 FTS
TSgt Philip W. Sulko, 1550 FTS
SSgt Lloyd R. Hill, 1551 FTS

Ranks and units are those at time of award. See MACR 900-3 for details on how to apply for your own milestone award.

C-130 Throttle Alignment

When is it Right?

There are many misconceptions about what should be considered normal or "correct" T56 engine operation, comparing torque, turbine inlet temperature (TIT), and fuel flow readings on one hand, and throttle lever alignment on the other. It seems only natural that the throttle levers controlling four engines of the same type, hopefully sharing equal portions of the load, should line up exactly, but it is not unusual to find they don't. What are the causes of throttle lever misalignment, and just how serious is it?

To find the answer, we must first recognize there are some things the T56 engine is not designed to do. Even if all engines are operating well within normal parameters and nothing is wrong, lining up the throttle levers will rarely produce exactly equal readings for torque, TIT, and fuel flow below crossover. Differences in engine performance and rich or lean fuel schedules prevent agreement among the instrument indications when the throttle levers are aligned below 65 degrees. If the engine rigging is correct, engine performance is within limits, no bleed air leaks, no compressor or turbine damage present, and the fuel control rich/lean schedules are within specifications, there is nothing left to further correct throttle misalignment. The null orifice adjustment will enrich or lean out the hydromechanical fuel schedule, but this setting is intended for adjusting engine starting temperatures and should not be used to correct RPM and torque discrepancies.

Above crossover, the situation is somewhat different. Here the engines are, in effect, being controlled by TIT, and the same TIT readings should be expected on all four engines when the throttle levers are aligned within one-half knob width of each other.

Aligned throttles may not necessarily produce equivalent torque or fuel flow, however. The main reason this happens is that engines perform differently. For example, consider what will happen if an engine performing at 102 percent is set to the same

TIT value as other engines whose performance is not as high. With the bleed air turned off, the high performance engine will show higher torque and fuel flow than the other. An engine with relatively low performance will indicate lower torque and fuel flow under the same conditions. Bear in mind that while standard engine performance is 100 percent, acceptable performance can be as low as 95 percent and some engines may go as high as 110 percent.

The four T56 engines powering a Hercules cannot, therefore, always be expected to produce identical torque and fuel flow readings straight across the board when the throttles are aligned above crossover. They should, however, yield equivalent TIT values. If the throttle levers cannot be aligned at equivalent TIT readings, a problem exists. The trouble may be in the engine control system, the indicators or the engines themselves. Let's examine some of the causes of discrepant throttle lever alignment more closely.

It's clear that the throttle levers can't be expected to align at a given TIT if serious trouble exists within such basic engine operating systems as the engine control rigging, the fuel controls, or the temperature datum system. But such malfunctions usually show up in a variety of ways in addition to throttle lever misalignment, and are not necessarily limited to a specific operating range. The kind of problem whose principal symptom shows up in the form of throttle lever misalignment tends to be more subtle.

Minor misadjustment of the engine control rigging; instrumentation problems; indicating circuitry error; damaged thermocouples and bleed air leaks are among the more typical causes of throttle lever misalignment above crossover. With the throttle levers aligned, compare torque, TIT, and fuel flow. If all indications for a particular engine are normal with respect to one another, but high or low when compared to the other engines, a problem with the throttle rigging is indicated. If TIT is high with the throttle levers aligned, but torque and fuel flow compare with the readings of the other engines, the problem is most likely a bad TIT indicator. If TIT is low but torque and fuel flow compare with the other engines, the problem may be a bad indicator or trouble with the thermocouples in the indicator circuit. High torque and fuel flow with normal TIT suggests defective thermocouples in both circuits. Alternatively, you may simply have a high-performance engine, as discussed above. A thermocouple system and performance check will be necessary to determine the cause of these indications.

Pay special attention to the results of an engine start. Were the TIT readings lower than normal? If so, was the start time normal? If start time was normal with no acceleration lag, then indicator trouble or thermocouple trouble on the indicator side of the circuit (or both) is a strong possibility.

Comparing the torque above crossover with the throttle levers aligned is another approach that can yield diagnostic information. If torque is high with the throttles physically aligned and TIT and fuel flow are normal, the torquemeter may be out of calibration.

If fuel flow and torque are low when the throttle levers are aligned and the TIT readings are in agreement, you may have a bleed air leak or improper operation of the bleed air pressure regulator and shut-off valve (on airplanes so equipped). Check the bleed air pressure regulator and shutoff valve with the switch in the ON position. The indicated pressure should be 50 psi, plus or minus 7. A high pressure reading can cause low torque and fuel flow. If the pressure regulator valve operation is normal, perform an engine inlet duct anti-icing check. If the check is performed properly, a torque drop of 800 to 1000 inch-pounds will be observed. The TIT will momentarily rise during the check, then return to schedule. If a smaller torque drop is noted, or none at all, one or both of the two anti-icing valves being checked could be the cause of the low-torque condition.

Keep in mind, bleed air leaks can occur upstream of the pressure regulator and shutoff valve. Anything that causes a loss of compressor air will also cause reduced torque and fuel flow. This includes leaks through holes or cracks in the compressor case, bleed air collector manifold, compressor bleed extraction pads, acceleration bleed air valves or combustion section drain valves. The torque loss will be relative to the magnitude of air leak.

Comparing fuel flow above crossover is the last item to consider. In general, high or low fuel flow above crossover with the throttle levers aligned and normal torque and TIT suggests a discrepant fuel flow transmitter or indicator.

When checking the causes of throttle lever misalignment, be sure to remember it can be both expensive and frustrating to try to fix something that isn't broken. The throttle levers cannot be expected to align exactly below crossover, and while they should align within one-half knob width when the engine TIT readings are matched above crossover, differences in engine performance are likely to prevent as good an alignment when torque or fuel flow are chosen as the standard. A working knowledge of the system's design and performance, coupled with sound troubleshooting techniques and solid judgment, will help keep your aircraft down-time low and provide more airframe hours for mission accomplishment.

Courtesy of Lockheed Service Newsletter

Cold Weather Quiz

A Few Questions for Winter Flyers

Winter is upon us. Thoughts of snow, ice, sleet and all that stuff also hint that it's time to do some extra studying. So we, the ink-stained wretches here at *TMF*, thought we'd ease the transition by picking and choosing some pertinent parts of the "Cold Weather Procedures" in our Dash Ones. For grins, let's start with a general question or three.

1. The most severe structural icing is most likely to be encountered_____
   a. in June over Panama.
   b. in the climactic hangar at Eglin.
   c. in a car wash at Anchorage, Alaska, in January.
   d. in visible moisture—supercold water from 0° to -20°C.

2. So, Bunky, how do you avoid, or at least minimize, the effects of structural icing?
   a. Don't fly!
   b. Ask the 'gator.
   c. Avoid visible moisture and/or clouds where the OAT is O° to -20C.
   d. Climb or descend to an altitude where the OAT is above 8°C.

3. You and/or your flight engineer discover some scattered ice on the wings and elevator. Attempted flight with the aircraft in this condition is _____
   a. advised.
   b. dumb.
   c. okay, if the ops officer told you the aircraft was needed to fly a Volant Silver mission the next day.

C-12

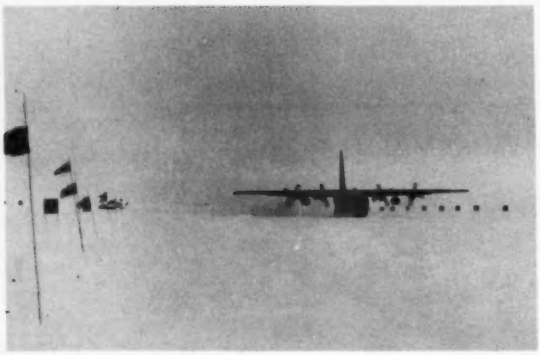
4. Lucky you and your right-seater get to RON at sunny Pease on December 24th. There is a forecast for a white Christmas. What are you thinking about?
   a. Strangling the scheduler.
   b. Sheltering the aircraft.
   c. Hanging stockings with your spouse or friend.
   d. Placing a double layer of material under the wheels to prevent their freezing to the surface (a hangar wasn't available).

5. Well, lucky you, again! It's December 26th, the Christmas dinner at the "O" Club wasn't too bad, and it's now time to blast off for home. After takeoff, you should be thinking about_____
   a. strangling the scheduler.
   b. leaving the gear down for a short period to remove snow, slush and the remains of the unfortunate marshaller.
   c. recycling the gear.
   d. with reservations, b and c.

C-21

6. Even small accumulations of ice on the wings can cause bad things to happen. These accumulations can cause unreliable information on the_____
   a. TDY funds-remaining indicator.
   b. grease low-level indicator.
   c. angle-of-attack indicator.

7. If fan speed (Nl) doesn't rise with turbine speed or stops during start attempts _____
   a. call GLASCO.
   b. call the command post.
   c. call a "stop start."



C-5A

8. Dover is covered with wet snow and slush. 'Bout an inch of the wet stuff all over the runway, taxiways—everywhere. According to the Dash One, can you take off?
   a. Sure, why not?
   b. No way!

9. You had to fly through icing conditions, so you kept your thrust settings at 50 percent N1 or above. In addition, you also advanced each engine to at least 90 percent N1_____
   a. every six minutes above 15,000 feet and every 10 minutes below 15,000 feet.
   b. every 15 minutes above 15,000 feet and every six minutes below 10,000 feet.

   c. every 10 minutes above 15,000 feet and every six minutes below 15,000 feet.
   d. until you made the pax sick.

C-141A/B

10. Before you fly into known or anticipated icing conditions, what should you do?
   a. Say a little prayer.
   b. Say a big prayer.
   c. Turn on the empennage de-ice system.
   d. Turn on the continuous ignition switch.

11. The minimum power setting required for effective engine anti-ice is_____
   a. Idle.
   b. 70% N1.
   c. 70% N2.
   d. Not stated.

C-9

12. Before applying de-icing fluid to the Dauntless Douglas (not to be confused with the Douglas Dauntless) it's necessary to_____
   a. get a fire truck.
   b. shut down the APU.
   c. sprinkle the wings lightly with salt.
   d. disconnect external power.

13. During descent, if icing conditions are expected, turn on engine and airfoil anti-icing at least___above the highest icing level in order to provide adequate warm-up time.
   a. 10,000 feet
   b. 1,000 feet
   c. 5,000 feet
   d. 15,000 feet

14. If in icing conditions, turn on engine anti-ice_____
   a. immediately before engine start.
   b. immediately after engine start.
   c. immediately before takeoff.
   d. immediately after takeoff.

C-130

15. When attempting a start with JP-5 and kerosene-type fuels at ambient temperatures below approximately -37°C (-35°F), what may happen?
   a. The engine may stall and overtemp.
   b. Lower than normal peak TIT.
   c. Nothing. JP-5 freezes at -26°C.

16. You, the flight engineer, notice the propellers and prop dome are covered in ice and snow. Should you operate the prop anti-icing and de-icing systems?

a. Sure, why not?
b. No way, Dilbert.

17. Propeller and engine anti-icing and de-icing should be on during takeoff and climb if temperature is_____ or lower.

a. 32°C
b. 32°F
c. 10°C
d. 10°F

H-53

18. The greatest danger caused by ice accumulation is_____.

a. Reduced rotor blade efficiency.
b. Loss of engine power.
c. Loss of tail rotor effectiveness.
d. a and c.

19. If you experience uncomfortable vibrations due to asymmetric ice shedding from the tail or main rotors, change_____

a. altitude.
b. airspeed.
c. rotor rpm.
d. seats.

H-1

20. As you depart on that long awaited TDY to CFB Moosehead for exercise Cold Duck, you check the OAT. If it is below 10°C with visible moisture, you'd better _____

a. wear your new issue electric socks.
b. turn on the pitot heat.
c. check the oil to ensure proper filling.
d. turn down the mission because when it gets that cold, it's *too* cold!

21. The enroute forecast to CFB Moosehead includes trace icing from the surface to infinity, and about 2,000 miles either side of course. You should _____

a. press on, because you can handle trace icing.
b. think twice about departing, because the Dash One doesn't recommend it.
c. press on and see if the weather gets better.
d. hold in the nearest "O" Club and wait the arrival of the next warm front.

H-3

22. Your Jolly Green-type flying machine is configured with contradhesive polyethylene anti-icing tape. The Dash One allows you to fly in _____

a. light ice.
b. trace ice.
c. moderate ice.
d. any icing condition.

23. The FOD deflector should be installed anytime _____

a. flight is conducted in visible moisture with a temperature below 5°C.
b. the flight engineer opens his lunch.
c. flight is conducted in known or forecast icing conditions.
d. answers a and b are correct.

THE ANSWERS

1. d
2. b and c
3. b
4. b and d
5. d
6. c
7. c
8. b
9. c
10. d
11. c
12. b
13. a
14. b
15. a
16. b
17. b
18. d
19. c
20. b
21. b
22. a
23. d

AWTH's Corner

This AC Pressed

the Limits

We in safety have read too many reports on the crew that pressed too hard, crashed an aircraft and killed themselves. One-upmanship within units still exists, mainly because no one wants to be labeled a wimp. Some supervisors remember "the good ol' days" in Vietnam when they performed extraordinary feats of airmanship and displayed great courage to get the job done.

But sometimes the "macho supervisor," while verbalizing the party line of safety, will silently encourage an unsafe act. Just like growing corn, it takes time and patience to season young crews. Press them too little and sometimes the mission won't get accomplished; press them too hard and a mishap may result. So, where's the line? We hope our supervisors have acquired enough real-world expertise to know. And what about the crewdog who won't stand up to his/her supervisor and state that a particular mission is unsafe and therefore—he/she ain't goin'? Is this the reaction of a wimp? Put these two together and it's likely you'll find an "Accident Waiting to Happen." We recently received an AWTH which we feel illustrates this point.

The mission recounted in the AWTH report was a low-level airdrop during an operational readiness exercise. Weather minima for the low-level structure were 3,000 and five. Actually, the weather was 1,500 and three, but the mission commander decided to press on. The lead aircraft took off with the other aircraft departing at five-minute intervals in trail. After the formation had flown three low-level routes at high altitude, the formation leader advised the weather looked fine up ahead indicating he would soon descend and continue the route low level. The young aircraft commander wingman and his crew, still operating in extended trail, started their descent through the next available "sucker hole" and began flying 500-foot modified contours in and out of very light, wispy, fog-like clouds. As the low-level flight continued, the aircraft commander entered what appeared to be more light clouds. Actually, these clouds were thick and the crew found themselves flying in what looked like the inside of a golf ball. The copilot called "High terrain ahead," and the pilot pulled back on the yoke as hard as he could. The safety observer yelled "stand her on her tail!" as the aircraft climbed and decelerated from 250 knots to 120. The cockpit was silent except for the beating of the props taking ever larger bites of air as the aircraft broke through the clouds to safety. The crew breathed a sigh of relief.

Once back on the ground, the crew analyzed the mission profile to get a feel for how close they had come to contacting the high terrain. They had come *too close*. The aircraft commander believed his strong desire to "hack the mission" was almost his undoing. When he received the PIREP, he felt he *had* to get down and fly low-level because everyone else was down there. His strong desire to prove himself as a brand new AC had made him an "Accident Waiting to Happen."

TMF salutes the courage of this aircraft commander for sharing his incident with our readers. While the greatest danger to us at *TMF* is falling backwards in our metallic-gray swivel chairs (two arm rests), we're still deeply concerned about the men and women performing MAC's many diverse missions. *No*, we haven't forgotten what the real world is like. We'd much prefer to read an *AWTH* (which incidentally we don't get enough of) rather than read a message which begins:

SUBJ: CLASS A FLIGHT MISHAP REPORT

The lesson this AWTH crew learned was invaluable, and hopefully we've all learned that the "macho" aviator who pushes too hard may lead to disaster.

Letters to Home

A Copilot's Diary

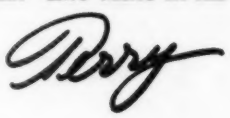
by Mr. James B. Zazas
Carthage, North Carolina

Dear Dad,

We arrived at Nellis AFB early this morning. You have to see this place to believe it! Big brother Mike was right; Red Flag territory is wall-to-wall fighters. One can truthfully say one-third of Uncle Sam's fighter force is on this place's sprawling ramp. And "Glitter City" is only ten miles away.

The thundering sound of afterburners brings back many fond UPT memories. Unlike the constant drone of the Herky Bird's engines and props, the staccato of F-100 engines and the smell of raw JP-4 make me wish I could "yank and bank" like Mike in his F-15.

Give my best to Mom.



Dear Dad,

We had our initial briefings today. These "games" we're going to play are super! The overall scenario, threats and tactics we'll use during our training are so close to the real thing. We've been restricted to 1,000 feet AGL on our first familiarization sorties, but after that—look out 300 feet. What a rush it will be jinking from fighters at 300 feet. Dad, did you ever get that low in Korea with your F-86?

I have a really super crew. My aircraft commander is "gung-ho" Red Flag. He was the former F-4 jock you met during our squadron open house. He still claims he washed out of F-4 RTU because he ejected during training, and not because of his over-aggressive approach to aircraft G limits and flamboyant attitude. Whatever the reason, he is considered by many pilots in the squadron to have "golden hands" because he can fly the pants off a C-130. I'm anxious to see how he plans to dogfight an aggressor F-5.

My navigator, flight engineer and loadmasters are the same excellent guys I had with me on the last rotation to Europe. I feel very comfortable working with familiar faces again.

Shortly after arriving, the AC and navigator indulged in some merriment in Las Vegas. This morning, the Operations Officer told them to "calm down." He reminded them we are here to learn, not party. I agree with his statement, but am sure there will be enough free time to enjoy Las Vegas.

Fred, the flight engineer, has a few more grey hairs since you last saw him. This Red Flag will be his fourth and probably final time here. He retires in three months. Like you, he'll retire with 25 years of experience under his belt. He admires the C-130 for the excellent workhorse it is, yet he always reminds us to respect the aircraft's age and limitations. Sound familiar? As you (and Clint Eastwood) always said, "A man has got to know his limits." When you taught Mike and me how to fly, you added the aircraft's limits in that phrase, too. I hold your keen insight very close.

I am off to "do battle." Give my love to Mom.

Dear Dad,

Wow! This Red Flag is fun! We flew our first 300-foot low-level mission today. Tony, my aircraft commander, had our C-130 bobbing and weaving through every nook and cranny on the range. Regardless of the terrain, he kept our bird at 300 feet (maybe a bit lower, at times) during the entire flight.

We were bounced by two F-5 Aggressors, but Tony shook them with ease. Even the

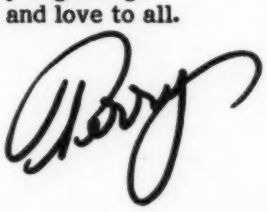
Special Category 1985 Flight Safety Writing Contest

ground threats couldn't get a clean shot. Tony was "yanking and banking" so much, I doubt even Mike in his F-15 could have gotten us. I worked closely with the navigator on map reading and timing and we made our drop on time and on target.

Dad, you should see how my AC maneuvers this 25-year-old warhorse around the range. He put the nav on the floor twice because of the G-loads. Both the navigator and the engineer claim they will strangle Tony if he doesn't "cool down" a bit with his maneuvering.

Tomorrow is another exciting day of Blue Force versus Red Force. Our range mission has us negotiating some rugged terrain. Tony said he'll show us how to hug the ridgelines for protection. There's so much to learn and I feel I am only beginning.

Take care and love to all.



Dear Dad,

I can't believe I've been here ten days. Since I last wrote, I've flown five more exciting sorties into the ten million acre range north of Nellis. Once-foreign landmarks like "Student Gap," "Mount Irish," "Worthington Peak," and "Pahute Mesa" are now very familiar reference points. Every day we fly in low, drop and get out—hopefully without getting "tapped" by unfriendly forces.

We were "shot down" three times yesterday, once by fighters and twice by those dreaded SAM sites. Tony flew most of the routes, though I should have, for the experience. Tony claimed he was feeling bad during the sortie. No wonder, he was in Vegas until midnight the night before.

Tony's constant partying has me worried. He's been like an unleashed wild man lately. The engineer is worried, too. He's been hooting like an owl that Tony should be stood down for a day. In fact, Fred, our engineer, claims he will go to the ops officer if Tony doesn't clean up his act. Fred claims our AC is oblivious to our overall welfare. With thousands of hours of experience under his belt, I think the engineer is right. Should I go to the ops officer myself?

By the way, we had our first incident on the range today. Blackjack, the range command and control, had to call a "knock-it-off." One of the F-4s from a foreign unit almost "bought the farm." He jinked himself into a scrape with terra firma. Somehow, he wrestled his crippled bird back to Nellis. We saw some photographs of the damage at debrief. He is one lucky guy to be alive.

Tomorrow is our next-to-last sortie. Rumor has it the scenario is a no-holds-barred type thing. I doubt the rumor; the folks here are too safety conscious and professional to allow such silliness. Regardless, my somewhat "unprofessional" AC has been boasting he will *not* be shot down again. I guess his statement means I'll be sharing a map again with the navigator while Tony twists and turns our poor Hercules.

Dad, I am going to ask the Operations Officer to say a word or two about limitations during our pre-mission brief. Maybe Tony and others will get the message. I get the uneasy feeling some pilots are impressed with Tony's macho maneuvering. This place doesn't forgive mistakes.

Give my love to Mom and all.
Your would-be fighter pilot son,

Dear Dad,

I broke down and cried again last night. That statement is hard for your steely-eyed, fighter pilot son to admit. Terry's death six months ago at Red Flag was so unnecessary, especially since so much information was available regarding the hows and whys of airframe abuse. In particular, I refer to Chapter V of the C-130 Flight Manual and an excellent Lockheed publication called *Structural Aspects, C-130 Operating Limitations.* If Terry's AC had taken the time to read and *understand* this information, I strongly doubt Terry's C-130 would have suffered fuselage failure.

I spent several hours last night reviewing Terry's flight publications to find the reasons why his aircraft broke up. True, the final report stated one cause of the breakup was the culmination of overstress imposed on the airframe at Red Flag and over the operational history of the aircraft. Even though Terry recognized the sometimes insidious nature and ultimate effects of airframe abuse, I was distressed to learn many crewmembers in his unit did not take the effort to read, much less comprehend the material contained in these publications *before* deploying to Red Flag.

Dad, when you taught us to fly, you used your F-86 experience to teach us about G loads, ultimate limits and the awesome effect our flight controls have on these loads. When I entered flight school, I was drilled in the dangers of pushing the aircraft, and ourselves, too far. I was exposed to a tactical aircraft that demanded *constant* attention to limitations. Instructors drilled me on how one unrecorded overstress on my part could lead to catastrophic consequences for the next pilot. I discovered quickly that the information contained in the flight manual was designed to state only what a pilot can do and that configurations and operations not contained therein were prohibited, unless waived by competent authority.

Today, as never before, the Air Force's transport category aircraft, particularly the C-130s, are in a position which demands constant attention to structural and personal limitations. Referencing the C-130 flight manual and the Lockheed publication, I'll bet few C-130 crewmembers realize they have enough elevator control to cause severe structural damage if maneuver limitations are not observed. Likewise, I'm sure they would be surprised to learn the 60-degree bank angle limit was imposed to limit loads to 2Gs during turn and roll maneuvers. Why have this restriction? Because the pilot's accelerometer size and location make it difficult to use. Finally, to quote from the Lockheed publication, I'll wager few pilots understand "airframes become less tolerant of exceeding structural operating limitations depending on operational history, accrued flight time, inspection and maintenance history, etc."

True, Lockheed and the Air Force have a fabulous, ongoing structural evaluation program, but what good is this program if a crewmember exceeds a limit here or there and doesn't properly record it? All these overstresses add up to shortened airframe durability, and in the case of Terry's aircraft, structural failure.

Enough about the aircraft. What about the crewmember? Flying with little sleep or trying to shake the effects of a few drinks from the night before is dumb. Sound judgment and knowing one's limits are of paramount importance. All mental and physical functions should be working in harmony any time you fly.

Before I get off my soapbox, what are some possible solutions? First, every crewmember attending any exercise should *read* and *understand* the limitations that apply to their position as specified in the flight manual. Pilots should pay close attention to Chapter Five. For C-130 pilots, the Lockheed publication makes an excellent supplement. Second, crewmembers should be sure they're physically and mentally prepared for flight. Finally, no one should be allowed to upset professional standards. One of the goals of any exercise is to teach intelligent teamwork, not reckless individualism.

Dad, in closing, I know you are asked to speak before graduating UPT classes on a regular basis. Please pass your wisdom on to those future aircraft commanders. Let them know even a "golden hands" pilot can cause the loss of an aircraft and take the lives of many. In turn, I'm sure they'll appreciate the terrible price one pays when personal and aircraft limits are exceeded.

Your son,

Mike

Mr. Zazas was commissioned in the Air Force after graduating from DePaw University in 1977 with a Bachelors Degree in Political Science. He completed UPT at Colombus AFB, Mississippi, and went on to fly C-130s at Pope AFB, North Carolina. Mr Zazas is presently employed as a Flight Officer for Piedmont Airlines based in Greensboro, North Carolina.

Helicopter In-Flight Icing

How Dangerous?

Winter weather means different things to many people. For those who have to drive, it is icy streets, dead car batteries and traffic jams. For the fixed-wing aviator, it is slick runways, frozen airfields and low ceilings. However, for the helicopter pilot, winter weather means in-flight ice. The helicopter pilot, more than any other operator of powered aircraft, must always be aware of the disastrous consequences of in-flight icing and those actions he or she can take to minimize its effects.

Today, military units and many other helicopter users routinely undertake IMC operations. No longer is the old "avoid visible precipitation" rule of thumb adequate for dealing with helicopter icing. In-flight helicopter icing becomes a major operational limitation in light of the increasing demand by the military for helicopter IMC operations.

Concern over helicopter operations in the icing environment is not without justification. In the early and mid-1970s, research conducted by the U.S. Army and other government agencies disclosed the

Adapted from an article by Arthur G. Negrette.

unique and dangerous effects of rotor blade icing. During these tests, the helicopter's autorotational characteristics deteriorated significantly with only a small accumulation of ice on the rotor blades' leading edge.

Further research and field operations have raised still other concerns relating to helicopter operations in the icing environment. They include:

- Ice induced engine failures.
- Asymmetric shedding of main rotor and tail rotor ice with associated vibrations.
- Increased power requirements due to additional rotor system ice-induced drag.
- Hazards to persons and property from rotor blade ice shedding.
- Operational restrictions associated with helicopter icing, i.e., restricted airspeeds, premature blade stall and significantly reduced range and endurance.

Ice-induced Engine Failures

Field reports from aircraft operators have repeatedly verified the susceptibility of helicopter turbine engines to in-flight icing. In 1977, the U.S. Navy reported several helicopter accidents and incidents involving ice-induced engine failures. On one occasion, a CH-46 helicopter on a cross-country flight to the San Francisco Bay area was operating in IMC and experienced a dual engine flameout induced by engine ice ingestion.

Another incident involved a Navy H-2 helicopter on a night flight in IMC over mountainous terrain. The Navy helicopter picked up unforecast ice while climbing to a higher altitude causing severe vibrations, the loss of both engines and a night autorotation on instruments over mountainous terrain. Fortunately, the H-2 broke out of the clouds over a lighted civilian airport and landed safely.

A Navy CH-46 was destroyed due to ice-induced engine failures. The aircraft was flying at 3,000 ft AGL in IMC and below the freezing level. Shortly after takeoff, the crew noticed ice forming on the windscreen and over the engine screens. The pilot initiated an emergency descent during which both engines flamed out. The pilot ditched the aircraft in the ocean. The time from takeoff to ditching was less than thirteen minutes. This dramatically illustrates the rapid and disastrous effects in-flight icing has on helicopter engines.

More recently, a U.S. Air Force HH-3 crashed and was destroyed when one of its two turbine engines flamed out due to a malfunctioning engine anti-ice pressure valve. This failure allowed engine ice ingestion, which caused catastrophic compressor blade damage.

Rotor Blade Icing

Helicopter in-flight icing difficulties are not limited to powerplant problems. The rotor blades are equally susceptible to icing. Helicopter operators around the world are familiar with the effects of rotor blade icing. North Sea pilots, for example, have reported extreme vibrations shortly after entering icing conditions caused by blade icing. Occasionally, these vibrations were sufficiently severe to prevent accurate interpretation of cockpit instruments. Army test pilots documented several occasions where test flights were abandoned only moments after entering icing conditions due to excessive vibrations caused by rotor blade icing. Reducing airspeed may lessen blade icing vibrations, but such a remedy treats only the symptom (severe vibrations) and not the cause (rotor blade icing).

Apart from causing severe vibrations, rotor blade ice also threatens flight safety by reducing the rotor system's autorotational qualities. Unfortunately, this fact was not discovered for years. However, in the early 1970s, artificial and natural icing tests conducted by the Army revealed that even moderate ice accumulations (about one-half inch) on inboard portions of the UH-1H rotor blade was sufficient to prevent safe autorotation in the event of an engine failure. Even small accumulations of rotor blade ice (one-eighth of an inch over one-third of the blade span) were noted to have significant effect upon the UH-1H's autorotational characteristics.

The loss of autorotational qualities results from greater ice accumulation on the inner portions of the rotor disc, which directly affects the blade's efficiency with respect to upward airflow during autorotation.

Consequently, when the leading edge of the rotor blade accumulates approximately one-half inch of ice on the first half of the blade span, minimum safe rotor RPM cannot be maintained during autorotation.

A reliable method to estimate ice buildup on the main rotor blades is to monitor power indications. Research indicates that blade icing of one-half inch or greater requires 5 to 12 percent more power (torque) to maintain a given altitude and airspeed than is required for a "no ice" condition.

Rotor Blade Ice Shedding

Some helicopter pilots disregard the hazards associated with rotor blade icing because they believe that ice shedding off the rotor blades due to centrifugal force will minimize or eliminate the critical effects of rotor blade icing. While in-flight ice shedding does occur, it is as likely to create a problem as it is to relieve one.

Symmetric shedding (equal amounts of ice leaving all rotor blades simultaneously) of rotor blade ice in flight can be beneficial by restoring the rotor blades to a more efficient configuration. Ice shedding also reduces aircraft gross weight.

Asymmetric shedding (unequal amounts of ice leaving individual rotor blades at different times), can create severe vibrations, depending on the degree of ice shedding symmetry and the type of rotor system. Asymmetric ice shedding can be minimized by avoiding static air temperatures below -5° C. Research indicates that while operating in environments of -5° C or warmer, shedding will generally occur symmetrically. Tests with UH-1 aircraft suggest that rapidly varying main rotor speeds or autorotating may induce symmetric shedding at temperatures of -5° C or warmer. Collective and cyclic inputs are generally ineffective in promoting symmetric shedding and may, in fact, result in asymmetric shedding. *At temperatures below -5°C, it is generally not possible for the pilot to induce ice shedding.*

Rotor blade ice shedding presents other dangers. Since ice shedding is most likely to occur when rotor RPM is varied significantly, shutting the aircraft down may send rotor blade ice deposits flying unpredictably at high speeds. Pilots and ground personnel should be especially alert for this hazard during rotor shut-down after a helicopter has been flown in conditions conducive to icing.

Other Operating Hazards Associated With Helicopter Icing.

When helicopters enter icing conditions, other operational hazards can be expected.

For instance, airspeeds must be reduced significantly. Further, since ice accumulation reduces rotor blade efficiency, significant increases in power will be required with an accompanying reduction in range and endurance. Maneuvering performance will also be restricted as the blade-stall region is lowered significantly in comparison to the "no ice" condition.

Rescue hoists and cargo slings are also known to malfunction after prolonged exposure to the icing environment. You can also expect unheated windscreens and windows to ice over, reducing forward visibility to zero.

Reducing Helicopter Icing Hazards

Over the long run, technological developments in helicopter design and support systems may enable the pilot to effectively cope with in-flight icing hazards. Until research and technology progress to this point, however, the following actions may be of assistance in minimizing the threat of in-flight icing hazards.

- Monitor engine instruments for indications of increasing power demands. This will provide early detection of rotor blade icing.
- Regard weather reports and icing forecasts with caution. Icing definitions used to describe the icing environment—trace, light, moderate and severe—do not differentiate with respect to different types of aircraft. What is considered light ice for one aircraft may be moderate ice for another.
- Avoid icing conditions if uncertainty exists about the scope of the icing environment. If unexpected in-flight icing is encountered, take any prudent action necessary to get out of the ice as soon as possible.
- Avoid abrupt or erratic cyclic and collective inputs when attempting to shed rotor blade ice accumulations since such inputs may cause asymmetric shedding accompanied with severe vibrations. Rapid variations in rotor RPM may be of some assistance in achieving symmetric shedding providing the temperature is -5° C or warmer.
- Recognize the extreme susceptibility of light helicopters to in-flight icing. The limited power available and faster rotor systems of light helicopters make these aircraft extremely sensitive to in-flight icing.
- Attempting to estimate main rotor blade ice accumulations by observing ice buildups on the windscreen or other parts of the aircraft isn't accurate since ice accumulates on the rotor blades at different rates. Increased power demands are a better indicator. However, ice buildups on other aircraft parts should key you to the fact that rotor blade icing has already occurred.
- After flight in icing conditions, take precautions to minimize the hazards caused by rotor blade ice shedding to ground personnel and equipment during rotor shutdown.
- If you find yourself in icing conditions, avoid sustained flight in the upper half of cumulus and stratus clouds where large water droplets and high liquid water content are normally found.
- When severe vibrations due to blade icing occur, reduce airspeed from normal cruise to 60 to 70 knots or less depending on the aircraft, mission profile and prevailing meteorological conditions.
- Penetrate the airspace over mountainous terrain perpendicular to the mountain range. This reduces aircraft exposure to intensive icing in regions where strong upward air currents on the mountain's windward side are capable of supporting larger than average water droplets, compounding the icing hazard.
- Ensure that rotor blades are deiced before you take off. Rotor blade efficiency is deteriorated by even the smallest accumulations of ice.
- Take time to review cold weather operating procedures contained in the operator's manual and your 55-series regulations. Know what the icing restrictions are for your aircraft.

Courtesy of Flight Safety Foundation Helicopter Safety Bulletin

Excellence in Airmanship

Capt. Douglas B. Salmon and crew, 41st Aerospace Rescue and Recovery Squadron showed exceptional skill and coordination while safely landing an HH-53 at night after encountering a severe flight control malfunction. This sortie was scheduled as a night vision goggle (NVG) training mission. Approximately 30 minutes after takeoff, climbing through approximately 5,600 feet on the first segment of the profile, the crew felt four or five rapid "bumps" in the cabin area forward of the main transmission. The crew checked the main transmission gauges and all other instruments—all were normal. Without any other indications, the crew considered other possible causes (turbulence or main rotor damper), and elected to continue the mission. Approximately five minutes later, now at 7,000 feet, the first and second stage hydraulic system servo-out caution lights flashed on. The flight controls began to jerk, and the crew felt moderate low to medium frequency vibrations. The copilot, Capt. Tillema, was flying the aircraft and observed all three hydraulic gauge indications fluctuating. Captain Salmon, the aircraft commander, took the controls and began an emergency descent toward an airport 12 to 15 miles away. Meanwhile, Captain Tillema attempted to reset the master caution light, but it continued to illuminate about every three seconds. SSgt. Bingham, the student engineer, lowered the gear. The instructor flight engineer, Sgt. Madia, then took over flight engineer duties. During the descent the aircraft vibrations gradually worsened. Captain Salmon decided the aircraft wouldn't make it to the nearest airfield, so he began searching for a safe landing spot. As the aircraft descended through about 500 feet, the scanners, Sergeant Henson and SrA. Breitbach, identified a possible landing area in front of the aircraft. The aircraft commander flew to the site, assisted by clearing calls from the scanners. At 200 to 300 feet and about 40 knots the aircraft's tail began shaking severely. Simultaneously, the second stage tail rotor caution light illuminated. Captain Tillema noticed the AC

Front row, left to right: Capt. Salmon, SrA. Breitbach, SSgt. Bingham
Back row, left to right: SSgt. Henson, Sgt. Madia, Capt. Tillema

was having difficulty keeping the aircraft under control. Noting the descent rate was about 1,000 feet per minute and the aircraft was at about 30 knots and 200 feet he began backing the AC on the controls. Together they stabilized the uncommanded collective control inputs and arrested the rate of descent. The aircraft began rolling 5 to 10 degrees during the final approach and a rollover appeared imminent. Despite the control difficulties, Captain Salmon landed the helicopter safely, avoiding damage to the aircraft and injury to the crew.

Without skillful piloting, total crew coordination and the proper use of night vision goggles, the consequences of this mishap might have been much worse. The outstanding performance of this crew prevented serious aircraft damage and possible loss of life. Congratulations on a job well done from the staff of *TMF*.

C.R. Terror

A Sting on the Snout SNAFUs the SID

"Sammy, wake up," yelled the Agitated Aviator as he banged on the competent copilot's BOQ door. "It's 30 seconds past alert time and we need to step lively if we're to take off on time for Ramsberg. The bus will be here in five minutes. Time's a'wastin', m'lad."

Sammy returned to consciousness, reluctantly giving up a beautiful dream in which he and C.R. stood on a reviewing stand, C.R. to receive his retirement papers and Sammy his symbolic key signifying the long-awaited status of aircraft commander. But alas, it would have to remain but a dream as MAC's Most Senior Second-in-Command pulled on his well-worn flight suit.

As they entered Base Ops, C.R. proclaimed, "We need to move smartly but carefully, Sammy m'boy. Col. Fang has been almost civil to me lately, no sense in doing anything to rekindle his ire. As the philosopher Publilius Syrus said in his Maxim 557, 'Nothing can be done at once hastily and prudently'."

Sammy, flabbergasted by his mentor's profound pronouncement, was barely able to utter, "Boss, where did you dig that one up?"

"I've been improving my mind, Sammy. Studying the great philosophers and writers of the ages. As Socrates said, 'There is only one good, knowledge; and one evil, ignorance.' But enough of that, lad, let's get cracking."

C.R. completed the 1801 with his usual haste, but also with surprising accuracy. Sammy scrutinized it with his usual minute attention to detail and could not find one error. Why, it was even legible!

The fuel plan was completed with similar dispatch, although C.R. was somewhat aided by the computerized fuel plan received from the MAC East AFB Command Center. When Sammy remarked what a great product it was, C.R. could not restrain himself from declaring, "You know of course, Sammy, those computer whiz-kids couldn't have developed it without my assistance. Why, with my vast experience in aviation, it was natural for them to seek me out and take advantage of my great store of knowledge dealing with fuel flow charts, takeoff data, etc. Back in my 124 days, they didn't call me the Ace of Avgas for nothing. Did I ever tell you about the time I was . . . . "

"Uh, boss, we're getting a little tight on time," Sammy interjected.

"Right you are, m'boy, right you are. Now, we'll plan on flying the MAC East AFB Davy Jones 006 departure," C.R. intoned in his most professional manner. "It calls for a turn to the east at 3 miles and a climb to 5,000 feet. Any questions? If not, let's adjourn to the local eatery for some last minute nutrition."

In the snackbar, Sammy received his second shock of the day. Instead of ordering his normal fare of chili burritos and grits, C.R. strolled up to the salad bar.

"Boss," he stammered, "what are you doing?"

"The crunch is on, Sammy," C.R. replied. "Doc Grossfinger has mandated a slimdown for me. Can you believe it? For me, the epitome of the MAC lean, mean, fighting machine. Five pounds a month, he says, or it's no TDYs. Imagine all the heartbroken senoritas, mademoiselles and frauleins left starving for my affections? I'll eat this rabbit food for their sake, Sammy. It wouldn't be fair to them not to."

"Sure boss," Sammy replied, surprised that C.R. was actually sticking to the intent of a direct order. "How's the slimdown going?"

"Lost 5.003 pounds last month," C.R replied. "A gross case of overkill. I'm positively wasting away, but I must think of all those lovely ladies, not to mention the terrible loss to the nation's defense if the country lost my services," continued MAC's Premier Pilot.

"That would be a real shame," Sammy mumbled, thinking of the upgrade to AC he'd receive if C.R. "was lost" to the nation's defense.

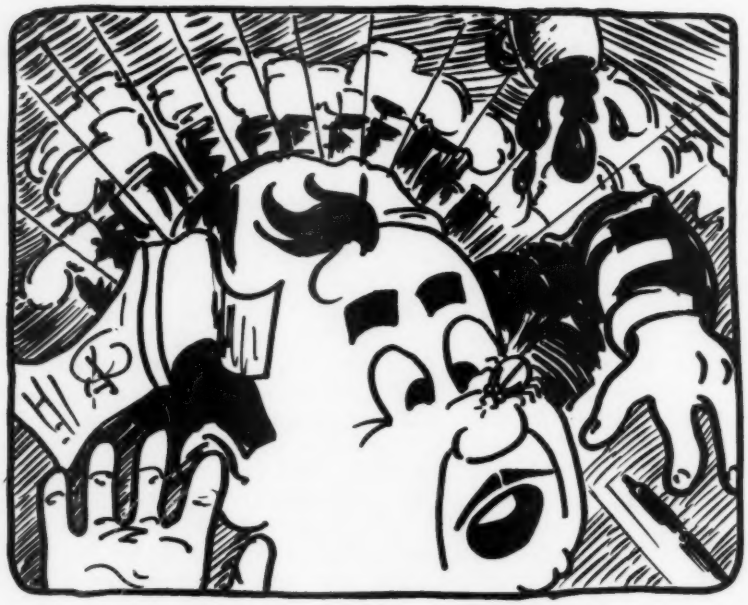
After their quick and unnaturally nutritious repast, the Ace Airlifter and his competent complement arrived at their gargantuous Galaxy only to find their aerospace steed sealed tighter than the proverbial drum.

"Criminently, what's happening?" C.R. bellowed. "We've a schedule to keep."

"Take it easy, Boss," offered Max Torque, the Pompous Pilot's efficient engineer. "The preflight, takeoff data, and loading are complete. It's bug season and they're spraying the airplane for the Red-Ringed Russian Rose Raider beetle. Can't take any to Europe, you know."

After the usual preliminaries, and surprisingly few miscues from the Magnificent Major, the fumigated flyers began their journey.

"MAC 95432 is cleared to Ramsberg via the Davy Jones



006 departure, flight plan route, expect FL 330 ten minutes after departure, departure on 123.45, squawk 2101," instructed clearance delivery. "Cleared as filed, boss," echoed Sam.

"Great," replied the Toreador of Turbofans. "Everything is going exactly as planned, looks like I'll keep that date on time. Did I tell you about this red-haired Scottish lass I met . . ."

C.R.'s amorous memoir was cut short by the appearance of a beleaguered bug. "Aaack! I'm being attacked!" C.R. screamed as a Red-Ringed Russian Rose Raider beetle landed on and sank its pincers into C.R.'s prominent probiscus before finally succumbing to the spray treatment. MAC'S Foremost Flier did a fair imitation of a windmill in his effort to rid himself of the nefarious nose nibbler. His arms and legs became a blur; approach plates, departure booklets, enroute charts and coffee cups flew aimlessly about the flight deck.

Sammy quickly braked the taxiing Galaxy to a stop.

"Are you okay, Boss?"

"What a disgrace," moaned C.R. rubbing his nose. "And what a mess!" he exclaimed, carefully rearranging his charts and refolding and replacing his departure booklet in its position in his approach plate holder. "Let's take off before something else happens."

"Roger, MAC 95432 cleared for takeoff runway 21. Maintain 2,000 'til turning eastbound," replied Sammy to the tower's takeoff clearance.

To the crew's amazement, the Fumbling Fieldgrader smoothly rotated the galloping Galaxy. Approaching 2,000 feet and three miles, he announced, "Three miles, cleared to turn and climb. Sammy, retune the navaids." As Sammy went about his appointed task, the Terror of the Airways promptly turned his four-engine flyer to a *westerly* heading.

"Hey, Boss," Sammy yelled, "You're turning . . . "

C.R. cut him off, "Exactly as depicted here on the Overland 013 departure. Turn to 270 degrees at three miles. It's attention to detail m'lad, that separates the great from the merely good."

"But, Boss, that's the wrong way!" Sammy screamed.

The realization of what had happened burst forth in C.R.'s miniscule mind.

"Gadzooks, I've been flip-flopped," he exclaimed, rolling his errant airlifter into a left turn. "They shouldn't print SIDs back to back like that. Someone with less experience than I could make a serious error."

"That was close, Chief," said Sammy after they rejoined the proper SID. "What if there had been another airplane out there? We could have had a mid-air. Colonel Fang wouldn't appreciate that at all."

At that moment the booming voice of Colonel Fang exploded into C.R.'s headset. "MAC 95432, Fang here. Terror, put that airplane back on the ground. I saw your escapade during my periodic RAPCON visit. How can you be such an empty-headed numbskull? Be in my office in 30 minutes."

"It looks like he didn't appreciate it after all, Boss", Sammy remarked.

"And there goes my date with my lassie, laddie", lamented the dejected Don Juan.

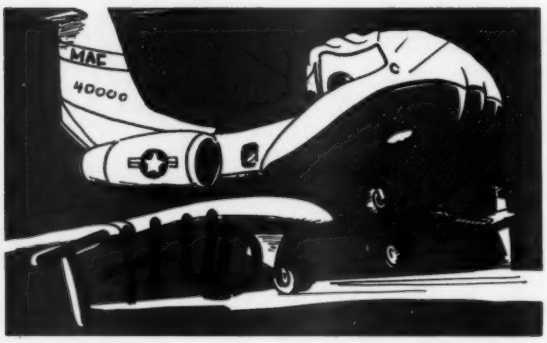
DOOR WARS

As the lumbering Herk lurched into the sky, the six crewmembers settled in for a routine qualification training mission. Passing through 5,000 ft, the instructor flight engineer noticed the cabin altitude was near zero, as it should be. The incredulous aviators spent the next ten minutes decisively dissecting the demands of the SID and eagerly attacking the training profile. Immediately after level-off at 17,000 ft, the eagle-eyed expert in the right seat observed the cabin altitude was also 17 grand and informed the crew. The astute engineer noted the door warning light illuminate and immediately initiated the inflight door warning checklist. Simultaneously, the five crewmembers on the flight deck, now feeling the effects of hypoxia, donned oxygen masks and attempted to check in with the loadmaster in the back. The instructor flight engineer answered the loadmaster's silent response by repairing to the cargo compartment where he found him off oxygen. The engineer assisted the lethargic loadmaster with his mask and the two crewmembers set about looking for the loathsome leak.

They determined the culprit was the cargo ramp, which had opened slightly. They recycled said errant ramp and obtained a locked indication. Shortly thereafter though, the ramp unlocked again. Further attempts to lock the ramp were unsuccessful and the aircraft landed, uneventfully, with the ramp slightly ajar.

After a nimble-fingered examination by the local flight surgeon, for hypoxia, all crewmembers were returned to flight status.

The maintainers determined the ramp malfunction was caused by a faulty ramp cylinder lock switch.



PHANTOM THUD

Everything was normal for the C-21 crew as they prepared for departure, then came the take-off roll. As the Lear reached rotation speed, the crew heard a loud "thud." Assuming the source of this sickening sound was a landing gear problem, the AC left the gear and flaps down and flew by the tower three times for a visual inspection of the gear. The tower controllers reported all tires and hydraulic lines they could see appeared normal. The left seater then retracted the flaps and gear and decided to press on to destination.

The crew completed the before-landing checks during the arrival descent and noted nothing unusual with the landing gear or anti-skid systems. However, as the C-21 touched down, the left brakes locked and the aircraft veered to the left. Undaunted by this twist of fate, the adept AC maintained directional control and stopped the aircraft on the runway. The crew and passengers evacuated without incident and the aircraft was turned over to maintenance for a look-see.

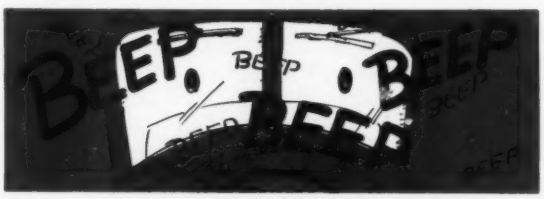
The maintenance inspectors found the left main gear tires worn but not blown. A closer look revealed no problems with the brake or anti-skid systems. In fact, the mishap investigator wrote that "for unknown reasons" the left brakes locked. The maintainers hypothesized the lock-up may have been caused by the parking brake handle inadvertently jarring out of position during take-off roll. However, this was never proven. Mysterious!

CONFUSED

Crew coordination, communication, and systems knowledge are phrases that one Huey crew will not soon forget. The crew was to provide SAR alert support at a local exercise range. Everything was normal until engine run-up when they discovered engine beep ranges out of adjustment. Additionally, the hydraulic failure warning system wasn't working properly. With his on-time take-off now seriously in question, the pilot called for maintenance assistance.

Engine specialists made adjustments to the engine beep ranges. The maintenance super left the aircraft to fetch some cotter pins in order to finish the job. Unfortunately, the crew figured that all work was completed on the beep range problem and turned their attention to the hydraulic warning write-up. Just as the AC reached for the hydraulic selector switch, the unsecured beep range actuator arm inadvertantly moved, causing the engine and rotor RPM to overspeed. Sensing this peculiar predicament, the copilot assumed control of the helicopter, retarded the throttle slightly, and pulled collective pitch. This, however, caused the aircraft to lurch into a hover. Luckily, the remaining engine troop, standing next to the aircraft, heard the engines accelerate and jumped clear of the ascending helo. The aircraft commander finally took the controls, stopped the overspeed, and landed uneventfully.

Post-flight inspection of the copilot revealed only a few bruises inflicted by the embarrassed AC. After this episode, the unit commander firmly expressed his desire for thorough ops/maintenance coordination as well as proper procedures for controlling an overspeed of this nature.



HOT BRAKES

After this Galaxy blocked in at a Far East air base, the eagle-eyed maintainers discovered a crack in the hydraulic line which supplies pressure to the brakes through the seven port valve. The shop chief immediately ordered a new line from the local supply shop but, alas, no such line was available. "No sweat", said the maintainers. "We'll simply cap off the non-essential line." Everyone in the "head shed" agreed and the LG guys made the "fix." Unfortunately, they capped off the line using a standard plug rather than the tape called for by the Dash ten, and the aircraft was released to the crew. During taxi, the C-5 reacted sluggishly. As a precaution, the AC deplaned a crewmember to check the brakes. The #4C1 and #4C2 brakes were extremely hot. Subsequently, the fuse plugs melted and the tires deflated. The AC declared an emergency which brought an immediate response from the fire department, who assisted in evacuating the passengers.

"Wait just a minute," you say. "Use tape instead of a standard plug when capping off a hydraulic line? I thought that putting airplanes together with tape and chewing gum went out with the Jenny."

Not so. In this case, using a cap instead of tape prevented pressure relief in the brake assembly, resulting in thermal expansion. This, combined with minor leakage from the number seven port valve, caused the brake to drag. If the aircraft hadn't been stopped and checked, the consequences of this not-so-humorous episode could have been much worse.

ALL TIED UP

After a blistering morning trouble-shooting engine problems on a UH-1, the functional check flight crew and maintenance team relearned an old, painful lesson. The morning engine runs were uneventful—almost routine. Maintenance Control released the crew for a quick lunch to be followed by more engine runs in the afternoon. Returning to the flightline after lunch, the pilot preflighted the aircraft, tied the main rotor blade down and waited for the maintenance team to return. The crew chief arrived thirty minutes later and positioned the APU for engine start. The pilot dutifully began the before starting engines checklist, engaged the starter switch and waited for the familiar whine of the T-400 engine. Instead, he heard an unmistakable pop and saw the red, six-foot tiedown strap swing into cockpit view still attached to the rotating main rotor blade. The panic-stricken pilot discontinued the start, but not before the tiedown strap severely damaged the tail rotor assembly and whip antenna. The pilot and the crew chief failed to ensure that all covers, tiedowns and groundwires were removed prior to engine start, as called for by the checklist. Both individuals involved were highly qualified in their specialties, which reinforces the point that even the best of us are subject to that insidious beast called complacency.

ALL CHOKED UP

The crew of this HC-130 was scheduled for night water pararescue personnel deployments. Approximately five minutes into the flight, the loadmaster reported fuel fumes in the cargo compartment. The crafty crew immediately initiated the smoke and fumes elimination checklist and began their emergency return to the home drome. During the descent, two pararescuemen complained of dizziness to the loadmaster. The PJs, equipped for a water drop, had been wearing unisuits for forty-five minutes and did not have oxygen masks available. (Unisuits are tight-fitting wetsuits designed to retain body heat and prevent water from flowing into the suit.) The aircraft made an uneventful landing and the two PJs were ushered off to the hospital for evaluations. The flight surgeon found no injuries or illness as a result of the incident and both were released to duty.

The subsequent safety investigation determined the cause of the smoke and fumes was a loose B-nut which backed off a fuel line from a fuselage fuel tank which allowed fumes to enter the cargo compartment. The two dizzy divers were apparently victims of several circumstances. PJs were not required to have oxygen available provided the entire flight was conducted below 10,000 ft MSL. The combination of toxic fumes, excessive heat, and the constricting nature of the unisuit contributed to the sinister symptoms. The fix to this precarious predicament is being worked at HQ MAC. Until it is resolved, however, all you Happy Herkers—beware.

After Deadlines

MADAR II INSTALLED ON C-5B—When the gigantic C-5B Galaxy made its first flight on 10 September 1985, more than just human eyes were keeping a close watch on how the aircraft fared.

On board the Galaxy during that maiden voyage was a "black box" system called the Malfunction Detection Analysis Recording (MADAR) II system. MADAR II is designed to aid C-5B flight and maintenance personnel in the detection and isolation of malfunctions in all the aircraft's subsystems, including propulsion, airframe, mechanical units, flight controls and navigation systems. A flight engineer or maintenance technician aboard the C-5B uses the display unit to see at a glance the aircraft's maintenance status. The improved MADAR II retains the good qualities of its predecessor, MADAR I, but is enhanced by state-of-the-art technology which includes faster information processing, high-speed printout with improved readability and easy loading, light-weight cassettes.

FINAL C-21A DELIVERED—The Air Force accepted delivery of the last of 80 C-21A aircraft under a lease agreement with Gates Learjet Corp. of Tucson, Arizona. The Air Force awarded a $175.4 million contract for the jets to Gates Learjet in September, 1983. At the end of the five year agreement, the Air Force has the option of extending the lease or purchasing the jets.

The C-21A is one of two aircraft types the Air Force is leasing as replacements for the CT-39. According to Aeronautical Systems Division officials, operations and maintenance costs of the CT-39 were higher than than the cost of leasing both the Gates Learjet C-21A fleet and the C-12F, which is made by Beech Aircraft Company.

Officials said that under the Gates Learjet lease, Gates provides maintenance and logistics support for the C-21A fleet and initial transition flight training for Air Force pilots.

53rd WRS EARNS SAFETY ACHIEVEMENT AWARD—The 53rd Weather Reconnaissance Squadron, Keesler AFB, was awarded the Director of Aerospace Safety Special Achievement Award for 1984. This annual award recognizes an individual or organization for outstanding safety contributions and achievements. Known as the "Hurricane Hunters," 53rd WRS aviators logged nearly 4,000 flight hours in 1984, without a major mishap. This extends their Class A mishap-free record to more than 98,000 hours and some 32,000 missions encompassing 17 years. Congratulations from the staff of *TMF*.

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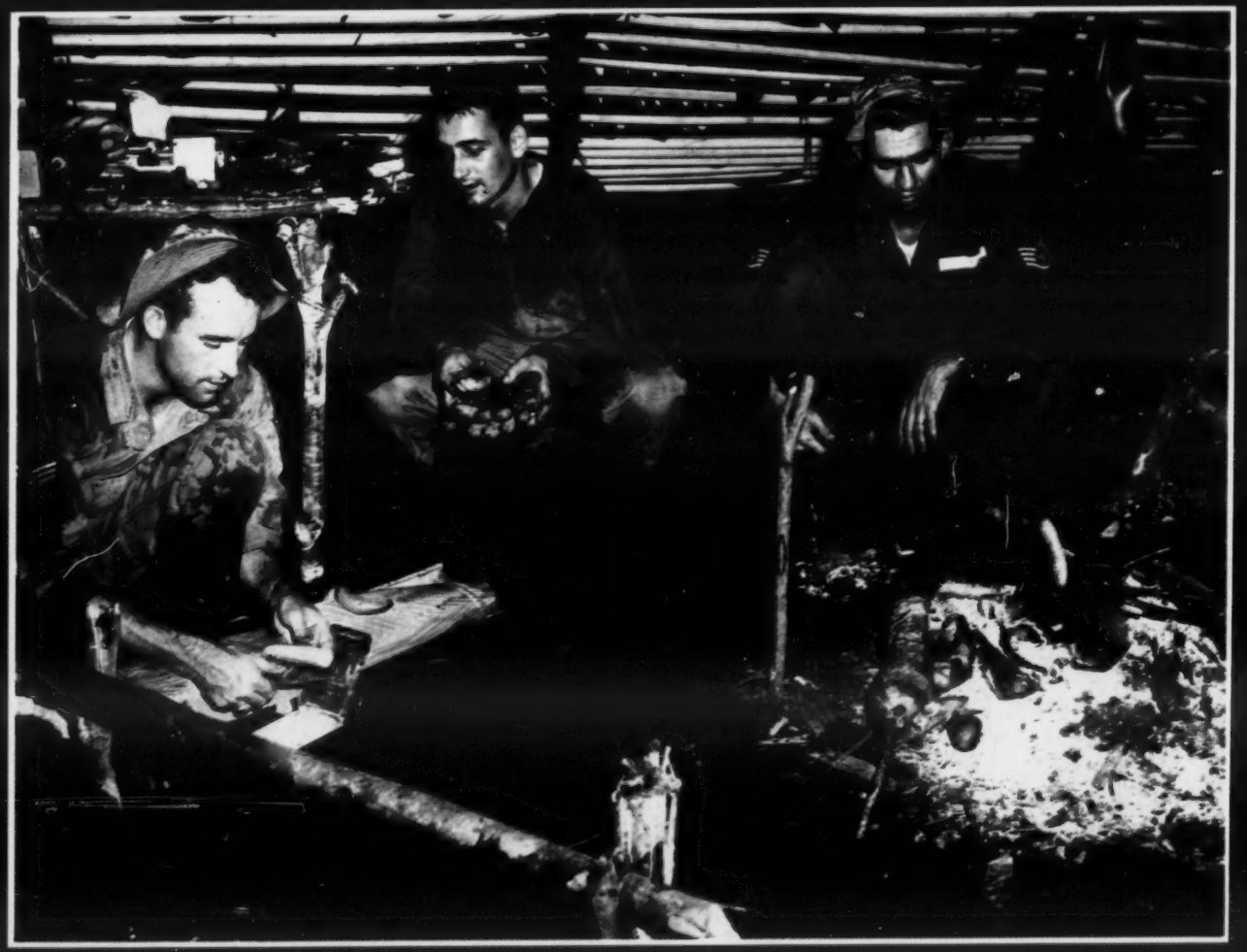
Touch'n Go



After you cut these up I'll start working on the Bearnaise sauce.